The Product Support Triad: A Critical Convergence

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In the "bad old days" of the Cold War, the United States relied on a strategic deterrence "triad:" long-range bombers, land-based intercontinental ballistic missiles (ICBMs), and mobile nuclear submarine-based ballistic missiles. The combination of these deterrents ensured that a viable strategic deterrence was always maintained.

Similarly, effective product support relies on a triad of focused (and carefully chosen) sustainment outcome metrics, effective interaction among the integrated product support (IPS) elements, and appropriately comprehensive governance.

Over the past several years, statute and DoD policy changes have significantly reinforced product support activities and procedures that, while always acknowledged as best practices, have often fallen victim to budget constraints and real-world events. The enhancements facilitated by the 2009 Weapon Systems Acquisition Reform Act (WSARA), OSD policy memoranda, the *Weapon System Acquisition Reform Product Support Assessment*, and

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implementing DoD and Service guidance are not radical; the cumulative effect has been to significantly strengthen the role of life cycle logisticians in weapon systems acquisition and to strongly re-emphasize the need to design for support, design the support, and support the design. In other words, deliver affordable readiness to the warfighter—and "affordable" in this case applies not only to the acquisition of the weapon system itself, but to its sustainment "tail." How does the triad enable these best practices?

Why Are Sustainment Outcome Metrics So Important?

Most acquisition professionals are aware that sustainment outcome metrics are focused on warfighter requirements, principally the availability components as well as materiel reliability, mean down time, and ownership cost. The sustainment key performance parameter (KPP) and key system attributes (KSAs) form the basis for development of performance-based life cycle product support metrics.

It is an article of faith in the life cycle logistics community that emphasis on reliability early in the life cycle will pay substantial supportability (and availability) dividends once a system is operational. Of particular note is the R*eliability, Availability, Maintainability–Cost* (RAM–C) *Rationale Report Manual*. The purpose of this manual is to assist combat developers, program managers, engineers, and life cycle logisticians in designing RAM into systems early in a program affordably, helping reduce overall life cycle costs.

Whether purely organic, purely commercial, or (most likely) a combination of public and private product support arrangements, DoD's clear preference for performance-based product support, articulated in DoD Directive 5000.01 and DoD Instruction 5000.02, dictates a careful selection of life cycle sustainment outcome metrics upon which these arrangements can be based. Great care must be exercised in determining these metrics; they must reflect and support the warfighter's requirements, particularly those contributing to operational availability, while bearing in mind the axiom, "Be careful what you ask for; you may get it."

Why Are integrated product support (IPS) Elements So Important?

The 12 recently established IPS elements, outlined in the April 2011 DoD *Product Support Manager Guidebook* (https://acc.dau.mil/psm-guidebook), serve as a powerful enhancement and update to the traditional ten Integrated Logistics Support (ILS) elements. Why was this done? The two additional elements, product support management and sustaining engineering, reflect the PSM and life cycle logistician's enhanced enterprise roles and responsibilities that transcend the traditional logistics domain.

The PSM, a key leadership position established by Congress in Public Law 111-84, Section 805, needs to be able to interface effectively with senior leaders from other functional domains including program management, contract management, business and financial management, and systems engineering, in order to develop and implement a viable product support strategy. The IPS elements not only address this need by identifying and defining the associated activities of the PSM, but more importantly convey how these activities are to be accomplished. Furthermore, the product support management element in particular provides the framework for the integration of all the other 11 IPS elements so that the product support solution that is delivered to the warfighter is fully integrated and meets the warfighter's needs in terms of readiness, reliability, and affordability.

Sustaining engineering, another of the 12 IPS elements, reflects the full life cycle focus of the PSM and the kinds of design interface activities, including reliability (the ability of a system and its parts to perform its mission without failure under a prescribed set of circumstances), availability (the degree to which an item is in an operable state and can be committed at the start of a mission at a random point in time), maintainability (the ability of an item to be retained in, or restored to, a specified condition), supportability (includes design, technical support data, and maintenance procedures to facilitate detection, isolation and timely repair or replacement of system anomalies), and affordability (the degree to which the life-cycle cost of an acquisition program is in consonance

Sustainment Metrics Definitions

Availability KPP: Mandatory for ACAT I; sponsor decision for ACAT II/III. Two components:

- **Materiel Availability:** Percentage of the total inventory of a system operationally capable of performing an assigned mission at a given time (Number of Operational End Items/Total Population)
- **Operational Availability:** Percentage of time a system or group of systems within a unit are operationally capable of performing an assigned mission (Uptime/(Uptime + Downtime))

Mandatory KSAs:

- **Materiel Reliability KSA:** Probability that system will perform without failure over a specified interval. MTBF = (Total Operating Hours/Total # of Failures)
- **Ownership Cost KSA:** Based on Cost Analysis Improvement Group (CAIG) elements: unit operations, energy/POL, maintenance, sustaining support, continuing system improvements, regardless of funding source (O&S Costs Associated w/ Materiel Readiness)

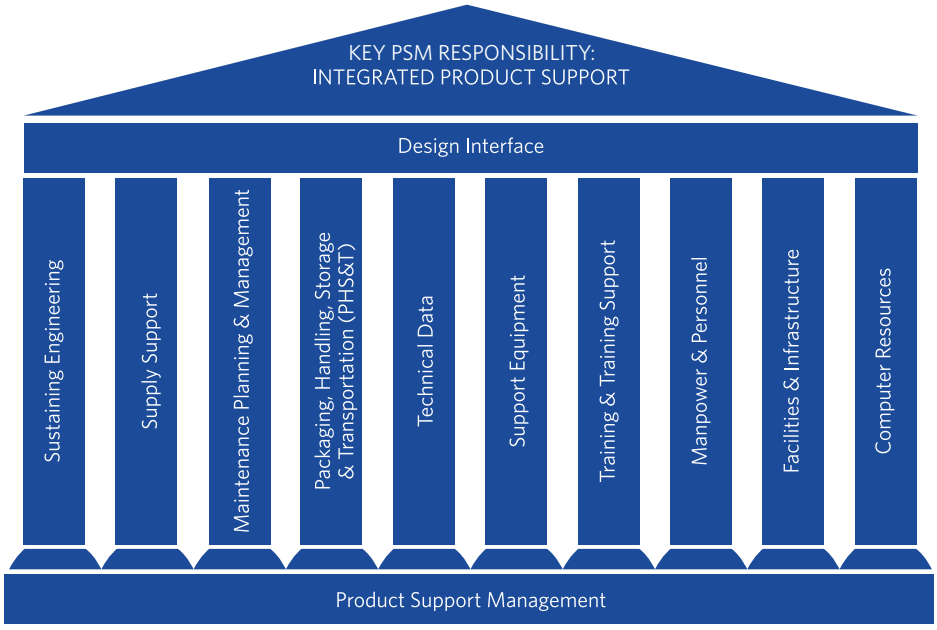
Plus a fourth Sustainment Outcome Metric: Mean Down Time

- A measure of average Total Downtime required to restore an asset to its full operational capabilities. MDT = (Total Down Time for All Failures/Total Number of Failures)

with the long-range investment and force structure plans), which carry over into the operations and support (O&S) phase of the life cycle. Other modifications to the traditional 10 ILS elements include:

- Maintenance planning transitions to maintenance planning and management, to incorporate maintenance management and execution activities along with the maintenance planning activities
- Training and training equipment becomes training and training support, emphasizing the life cycle focus of the training strategy and implementation
- Facilities becomes facilities and infrastructure, highlighting the fact that facilities are more than simply "brick and mortar" buildings
- Computer resources support changes into computer resources, bringing the computer resources support ILS element up to date by providing more focus on the information technology aspects of computer resources.

Figure 1. IPS Element 'Pillars'



To facilitate implementation, execution, and understanding of these 12 elements, the *IPS Element Guidebook*, fielded by DAU in November 2011, provides detailed information about each of the 12 elements and complements Appendix A of the *PSM Guidebook* by providing definitions for each IPS element and sub-element. It also identifies key activities and products for each IPS element and provides a much-needed "how to" for these activities throughout the life cycle. The guidebook is an invaluable reference in helping the program logistician answer the "what, how, and when" product support planning and execution questions.

Key Product Support Governance References

DoD Directive 5000.01
https://acc.dau.mil/CommunityBrowser.aspx?id=314789

DoD Instruction 5000.02
https://acc.dau.mil/CommunityBrowser.aspx?id=332529

Defense Acquisition Guidebook, Chapter 5
https://dag.dau.mil/

Product Support Manager Guidebook
https://acc.dau.mil/psm-guidebook

Business Case Analysis (BCA) Guidebook

Reliability, Availability, Maintainability, and Cost Rational Report Manual
https://acc.dau.mil/CommunityBrowser.aspx?id=298606

Integrated Product Support Element Guidebook
(link to be provided—not published as of 11-15-11)

Why Is the Added Emphasis on Governance So Important?

What exactly is governance? For our purposes here, "governance" relates to "consistent management, cohesive policies, guidance, processes and decision-rights for a given area of responsibility." Simply put, the increased emphasis on life cycle management governance is intended to both improve product support and enhance the tool kit available to program product support personnel. As a life cycle logistician in weapon system acquisition, what am I supposed to be doing—and when? The recent emphasis in public law, OSD policy, and specific areas addressed by the new guidebooks all strive to answer not only the "what?" but also the "how?" Outcomes are critical, but we also need to make sure our workforce knows routes as well as destinations.

The recent emphasis on product support and life cycle management governance can be categorized as both strategic and tactical. The strategic governance addresses—among other topics—the increased emphasis on affordability in the acquisition of weapon systems, initiatives grouped under the broad rubric of better buying power. Strategic governance also continues to emphasize and clarify the roles and responsibilities of key program personnel (e.g., the product support manager). As another example, the sustainment "quad chart" (Figure 2) mandated by DoD policy for major defense acquisition programs (MDAPs), focuses on those areas key to effective product support: the sustainment approach and related issues, schedule, metrics, and cost. While required only for MDAPs, the focus areas actually apply equally to all programs; the chart provides an excellent "snapshot." Is any of this re-

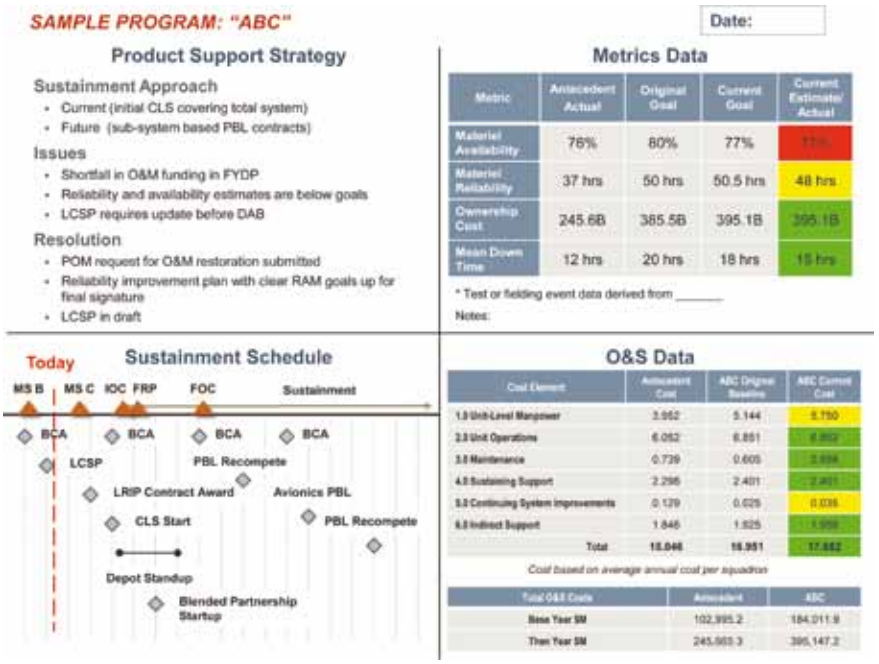
ally new? Generally not; most of the recently issued product support governance policy seeks to reinforce and reemphasize practices and procedures that experience has taught will lead to effective and affordable supportability. The "quad chart" has become a critical component of major program reviews as well as milestone decision reviews; the emphasis on planning for affordable sustainment has migrated from "the last bullet on the last chart in 'backup'" to the forefront of acquisition decisionmaking.

The governance tactical focus is on "news you can use." *The PSM Guidebook, the BCA Guidebook, the Logistics Assessment Guidebook*, and others still in development (all of which can be accessed at https://acc.dau.mil/productsupport) each concentrate on the "how to and when" aspects of product support planning and implementation. See sidebar for a list of some of these important tools. Again, most of the content of these documents is not radically new—but for the first time, the life cycle logistician and program leadership have comprehensive, detailed resources that will lead to supportability success.

Three-Legged Stools Are the Most Stable

The renewed—and increased—emphasis on metrics, integrated product support, and product support governance is important to the program logistician, certainly. But this emphasis also benefits the customer, the program manager, the system engineer—basically all stakeholders—because it focuses activities and resources on a common goal and contributes directly to integrating program efforts toward a common goal.

Figure 2. Sample Quad Chart



These three key areas—sustainment metrics, the integrated product support elements, and governance—meld together to provide program managers, product support managers, system engineers, and life cycle logisticians a detailed structure and body of process knowledge leading to our ultimate goal: delivering to the warfighter weapon systems that meet their validated requirements, and which the taxpayers can afford.

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